

REMARKS

The Office Action dated April 20, 2005, has been reviewed carefully.

Reconsideration of the rejections is respectfully requested on the basis of the following remarks.

The present invention provides an improved method and associated apparatus for identifying articles of interest by employing a plurality of RF antennas, each having a non-linear element and being resonant at one of the plurality of different RF frequencies, and being positioned on an article of interest. RF energy of a first frequency is employed to interrogate one of the RF antennas and convert the same into a reflected RF energy of a different frequency from the first frequency. The reflected energy is sensed and, on that basis, there is a determination made on the basis of the different frequencies as which specific antenna is present on said article. The non-linear element may be a rectifying diode. These features are recited in independent method Claim 1 and dependent method Claim 2.

The other independent claims in the application are Claims 15, 24 and 33.

Claim 15 is an independent apparatus claim which generally parallels method Claim 1 with dependent Claim 16 paralleling dependent Claim 2.

Independent Claim 24 recites a method of monitoring a physical property which includes providing an antenna having a non-linear element whose response depends on the physical property being monitored. The RF energy of a first frequency is employed to interrogate the RF antenna and convert the interrogated RF energy into reflected RF energy of a different frequency from the first frequency and the reflected RF energy is sensed on the basis of the different frequencies to determine the state of the physical property. Dependent Claim 25 recites the non-linear element being a rectifying diode.

Independent Claim 33 is an apparatus claim directed toward monitoring a physical property and generally parallels Claim 24 with Claim 34 being a dependent claim which generally parallels Claim 25.

The additional features recited in the dependent claims will be considered in the portion of the amendment which is responsive to specific elements of the Office Action.

CLAIMS 1-41 – SECTION 103(a)

These claims were rejected on the basis of Augenblick in view of Greene.

Augenblick teaches the activation of a target (24) containing a diode where the activation signal is an amplitude-modulated carrier signal. The detection is, therefore, based on a modulated signal as opposed to Applicants' invention which is based upon having a plurality of RF antennas, each having a non-linear element and being resonant at one of a plurality of different RF frequencies positioned on an article of interest and interrogating the antenna with RF energy of a first frequency converting and interrogating the RF energy into a reflected RF energy at a different frequency from the first with sensing, enabling the determination of if a specific antenna is present or the status of a physical property. By contrast, the Augenblick amplitude-modulated signal would deliver the primary power to the remote device. Applicants have recited this distinction in independent Claims 1, 15, 24 and 33.

Further, the non-linear element is recited in dependent Claims 2, 16, 25 and 34 as being a rectifying diode.

Further, there is no easy manner in which the Augenblick teaching could be extended to a multiplicity of antennas.

Considering Claims 3 and 26, the claimed invention states that the difference in said different frequency is about double the first frequency. By contrast, the modulating of the carrier F by f_m involves a spectrum wider than the simple spectrum of the carrier. The

radiation of the carrier under the typical condition $f_m \ll F$ implies a modulated back scatter, where the relatively slow variation of f_m is most difficult to detect. The low-frequency back scatter, f_m , requires a much larger antenna than the corresponding $2F$ which is employed in Applicants' invention as recited in these claims.

Referring once again to the independent Claims 1, 15, 24 and 33, the Greene reference has been cited for the concept of sensing reflected RF energy on the basis of different frequencies to determine if a specific antenna is present. The Greene patent discloses the combination of a set of resonating materials to form a target. It would not, however, as disclosed, present a system which is "operable at great distances" (Column 3, Line 6) with frequencies greater than 1 GHz (Column 4, Lines 15-19) as this would be totally unrealistic. As stated at Column 7, Lines 13 through 16, in Greene, with the range of frequencies set forth in there, one-quarter wave dimensions of resonators would be on the order of 75 mm, which is not realistic in any sense, and at the upper limit, might be practical, but would be very expensive. Further, Greene contains no teaching as to how the resonating devices are to be connected to any apparatus to function as a reflection device in or on a remote target. The teaching of Greene essentially covers a classical kaleidoscope.

Also, Applicants' method as set forth in Claim 1 does not have the requirement of a low frequency to modulate the higher frequency "carrier" as in Augenblick.

Considering the combination of Augenblick and Greene, it is respectfully submitted that one cannot gracefully combine the two teachings without at least substantial destruction of the individual teachings. The amplitude-modulated signal concept as taught by Augenblick would not readily combine with the set of resonating materials to form a target as disclosed in Greene. Further, the capabilities, functions and numerical limitations of each would not blend gracefully.

The Augenblick teachings are for a single target which is to be differentiated from the present invention. See Column 3, Lines 7-17; Column 4, Lines 13 through 32 and Column 4, Lines 52-55 of Augenblick. The single frequency of Augenblick is not consistent with Applicants' claims. Also, Greene, as stated in Column 3, Lines 13 through 28, is simply a general system operation of all such interrogator and tag devices and related systems. It is further noted that Augenblick in Figure 6 discloses a detection method based upon $2f_m$.

As stated in the case of In re Imperato 179 USPQ 730 (CCPA 1973) at Page 732:

With regard to the principal rejection, we agree that combining the teaching of Schaefer with that of Johnson or Amberg would give the beneficial result observed by appellant. However, the mere fact that those disclosures can be combined does not make the combination obvious unless the art also contains something to suggest the desirability of the combination.... We find no such suggestion in these references.

There is no such suggestion in either reference. (A copy of this case is enclosed for the convenience of the Examiner).

DEPENDENT CLAIMS

Dependent Claims 2, 16, 25 and 34 have been discussed hereinbefore.

With regard to Claims 4 through 6 and a reference to Figure 6 of Augenblick, the patent would teach one skilled in the art the modulating frequency, which, as stated hereinbefore, is totally different from Applicants' method and apparatus, wherein the back scatter is double the carrier and not double the modulating frequency as in Augenblick.

With regard to dependent Claim 7, the distinctions noted hereinbefore between, on the one hand, Augenblick and Greene, as considered in combination at Applicants' employing two distinct interrogating frequencies in the context of Claim 1, from which Claim 7 depends, to determine if an article of interest is applicable at this juncture.

The features of dependent Claims 8, 9 and 10 are not asserted as independently establishing patentability apart from the claim or claims from which they depend.

With respect to Claim 11, the relationship between the interrogation of one RF antenna and conversion to reflected RF energy, while avoiding the undesirable amplitude-modulated carrier as taught by Augenblick and providing for the flexibility of making the determination as not taught by Greene individually or in combination with Augenblick renders Claim 11 patentable.

With regard to Claim 12, which recites a second non-linear element cooperating with the non-linear element to provide a variable readout as a function of a specific physical condition, it is respectfully submitted that Augenblick does not disclose a second non-linear element and, in fact, the additional elements of Augenblick, such as in Figures 7A, 8A and 9A, are linear elements necessary to produce the desired resonance in order for the device of Augenblick to function.

With regard to dependent Claim 13, it is respectfully submitted that the reference of Augenblick as well as all other portions thereof fail to teach a “physical condition” such as those recited in Applicants’ dependent Claim 13, including the relation as the reference is to a signal which is radiated from the target as contrasted from radiation as a “physical condition”.

With regard to dependent Claim 14, in addition to the distinctions noted in respect of Claims 12 and 1 from which it depends directly or indirectly, this recital is to employ non-linear elements as a variable non-linear element, when, in fact, Augenblick clearly will teach one skilled in the art that his elements are linear elements.

Turning to independent Claim 15, the comments made hereinbefore are equally applicable with the meaningful difference between the rectifying of the carrier as in

Applicants' invention as contrasted with Augenblick's modulating frequency and the additional comments in respect of Greene and the combinations of these two references.

In respect of dependent Claim 16, the reference is to non-linear elements and a "rectifying diode" whereas the diode in the recited art is for a different purpose.

The features of dependent Claims 17 through 21 are distinguishable over the art in the context of the claims from which they depend and for the reasons stated hereinbefore.

With respect to dependent Claim 22, it is respectfully submitted that Augenblick does not disclose a second non-linear element cooperating with the non-linear element, but rather discloses a linear element.

The comments made in respect of dependent Claim 13 are equally applicable in respect of dependent Claim 23.

As to Claim 24, the comments made hereinbefore in respect of Augenblick and Greene considered both individually and in combination are equally applicable. Augenblick is totally silent on the measurement of any state of physical properties based on frequency of determination. Further, there is no teaching of the non-linear element to alter the reflected signal, such as a VAR, that would specifically change the frequency to reflect the state or change in state of the monitored physical condition.

With regard to dependent Claims 25 and 26, the comments made hereinbefore, with respect to Claims 2 and 3, are equally applicable at this juncture.

With regard to dependent Claims 27 through 28, these are not asserted as independently contributing to patentability, apart from the claim or claims from which they depend.

With respect to dependent Claim 29, Applicants claim double the frequency of the carrier as contrasted with the Augenblick doubling of a modulating frequency as discussed

hereinbefore. Claim 30 is asserted as being patentable based upon dependency from Claim 24.

With respect to Claim 31, there is no teaching of a second non-linear element in Augenblick, but rather one skilled in the art would be taught that he should employ only one non-linear element in the context of the Augenblick disclosure. With respect to Claim 32, the comments made hereinbefore in respect of Claim 13 and Claim 23 are equally applicable.

The comments made in respect of independent Claim 1 and the distinction *inter alia* between Applicants' RF frequency as opposed to Augenblick's amplitude-modulated signal are equally applicable at this juncture. Similarly, the comments made in respect of dependent Claim 2 are equally applicable in respect of Claim 34 and the comments made in respect of Claims 17 through 21 are equally applicable in respect of Claims 35 through 39.

With respect to Claims 40 and 41, Augenblick contains no teaching of use of a second non-linear element, but rather has only one non-linear element.

ADDITIONAL ART

The prior art made of record, but not employed, has been reviewed, but is not deemed to be as relevant as the applied art.

SUMMARY AND CONCLUSION

It is respectfully submitted that the foregoing analysis establishes the fact that Applicants' independent Claims 1, 15, 24 and 33 are patentably distinct from the applied art and that Claims 1-41 are in proper form for the issuance of a Notice of Allowance. Such action is respectfully requested at an early date.

Respectfully submitted,



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benefit of the doubt "as to whether the trade would not be confused and the public misled" must be given "to the prior appropriation."

Similarly, the rule that doubt as to likelihood of confusion shall be resolved against the newcomer has been applied in the Patent Office in ex parte cases from an early time as shown by the decisions in *Ex parte Brown*, 1909 C.D. 96; 143 O.G. 561 (Com'r.); *Ex parte Barrett Mfg. Co.*, 1910 C.D. 225, 160 O.G. 1272 (Com'r.); *Ex parte St. Anthony Milling & Elevator Co.*, 1910 C.D. 253 (Com'r.); *Ex parte The Auto Grand Piano Co.*, 1910 C.D. 86, 155 O.G. 307 (Com'r.); *Ex parte The Charles E. Hires Co.*, 1912 C.D. 203, 180 O.G. 879 (Com'r.).

The decision of the board is *affirmed*.

Court of Customs and Patent Appeals

In re IMPERATO

No. 9114

Decided Nov. 15, 1973

PATENTS

1. Patentability — Anticipation — Combining references (§51.205)

Patentability — Invention — In general (§51.501)

Fact that disclosures of references can be combined does not make combination obvious unless the art also contains something to suggest desirability of combination.

Particular patents—Ore Products

Imperato, Lump Ore Products and Methods of Making Same, claims 1 to 5 of application allowed.

Appeal from Board of Appeals of the Patent Office.

Application for patent of Louis G. Imperato, Jr., Serial No. 797,825, filed Feb. 10, 1969; Patent Office Group 115. From decision rejecting claims 1 to 5, applicant appeals. Reversed.

EUGENE F. BUELL and BUELL, BLENKO & ZIESENHEIM, both of Pittsburgh, Pa., for appellant.

JOSEPH F. NAKAMURA (ROBERT D. EDMONDS of counsel) for Commissioner of Patents.

Before RICH, BALDWIN, LANE, and MILLER, Associate Judges, and ALMOND, Senior Judge.

ALMOND, Senior Judge.

This is an appeal from the decision of the Patent Office Board of Appeals affirming the examiner's rejection, under 35 U.S.C. 103, of claims 1-5 of appellant's application ¹entitled "Lump Ore Products and Methods of Making Same." We reverse:

According to the record, low-grade ores, from which refined metals are obtained, must be upgraded by a "beneficiation" process before they can be employed in metallurgical furnaces. The beneficiation process involves grinding the ore to a finely divided state in order to facilitate the removal of impurities. However, the fineness of the upgraded ore reduces its usefulness in the metallurgical process to which it is submitted in order to recover the refined metal. Therefore, the finely divided ore is formed into lumps of sufficient size to be efficiently employed in a metallurgical furnace, e.g., a blast furnace.

One process for making lump ore from a finely divided ore is known as the "carbonate bond process." It involves combining the finely divided ore with an oxide or hydroxide of an alkaline earth metal, oxides and hydroxides of calcium and magnesium are commonly used, and up to 10% water. The mixture is formed into lumps by known procedures and then treated with carbon dioxide gas to convert the metal oxide or hydroxide to the corresponding carbonate. Appellant's invention, an improvement of this basic process, involves adding free sulfur to the finely divided ore before the carbon dioxide treatment. Claims 1 and 4, the only independent claims in the case, are representative:

1. A low temperature method of making ore aggregates such as lumps and pellets having high strength at elevated temperatures comprising the steps of:

(a) admixing finely divided metal containing ore with one of the group consisting of oxides and hydroxides of an alkaline earth metal, a small amount of free sulfur and sufficient water to form the mass into aggregates;

(b) forming the mixture into aggregates;

(c) reducing the moisture level in the aggregates below 10%;

(d) subjecting the formed aggregates to an atmosphere of carbon dioxide until a substantial portion of the alkaline earth metal is converted to alkaline earth carbonate in situ; and

(e) removing the formed aggregates to the atmosphere for storage and use.

¹ Serial No. 797,825 filed February 10, 1969.

4. A lump ore product consisting essentially of a finely divided metal containing ore, a small amount of free sulfur, less than 10% water and a bond of alkaline earth carbonate formed in situ.

Claims 2 and 3, which depend from claim 1, and claim 5, which depends from claim 4, add limitations not pertinent to our resolution of this appeal.

According to appellant, the lump ore obtained by use of his invention has strength characteristics² at low temperatures similar to that obtained by the basic carbonate bond process. However, at high temperatures his lump ore has up to 45% higher strength than an ore obtained by the prior art process.

Rejection

The board affirmed the examiner's rejection under § 103 based on combinations of the following references:

Amberg 2,844,457 July 22, 1958
 Schaefer et al. (Schaefer) 3,027,251
 March 27, 1962
 Johnson et al. (Johnson) 3,370,936
 February 27, 1968
 Russo (Canadian patent) 730,091
 March 15, 1966
 Bell 3,503,734 March 31, 1970

Amberg and Johnson disclose the basic carbonate bond process described above. Schaefer discloses a process for pelletizing metal ore, particularly pyrites, which involves treating the ore with free sulfur (1-10% is said to be effective), heating the mixture to a temperature above the melting point of sulfur, and then cooling it.

Russo describes a process for fashioning articles from finely divided ferrous material. The usual process involves compacting the iron powder with a small amount of graphite and a lubricant at high pressures (50-60,000 psi) and high temperatures (about 2050°F.) for approximately thirty minutes. Russo found that by incorporating free sulfur in the mixture prior to the molding operation, a finished article having higher rupture strength could be obtained.

Bell describes a relatively complex process for treating iron containing ores of the type known as "lateritic" ores. These ores are complex mixtures of metal oxides which contain valuable amounts of the oxides of iron, nickel and/or cobalt. The other principal ingredients of these ores are the oxides of magnesium, aluminum and silicon.

The basic process involves grinding the ore and combining it with a reducing agent. This composition is pelletized and heated under conditions whereby all the nickel and cobalt

oxides and up to 92% of the iron oxide are reduced to form the free metal. At the temperature selected for the reduction, the free metals coalesce within a pellet into particles of iron alloyed with the nickel and cobalt. The pellets are then ground and the iron particles magnetically separated from the nonreduced portions of the ore.

The process is not without a serious problem since at the operating temperature the pellets soften and adhere to each other and the walls of the vessel. To avoid this, Bell adds a refractory oxide to the ground ore before pelletization. When such a pellet is heated, the softened ore coats with the refractory oxide to form a hard coating about the pellet. This coating does not soften thereby stabilizing the pellet at high temperatures and preventing it from adhering to other pellets and the vessel.

Bell also discloses that free sulfur may be added to the pellet as an optional ingredient. Its function is to improve the coalescence of the free metals into particles.

In view of this art, the board succinctly stated its conclusions regarding the propriety of the rejection in the following way:

Claims 1 through 5 were finally rejected under 35 U.S.C. 103 as unpatentable over either Johnson et al. or Amberg in view of either Russo and Schaefer et al. We agree with this rejection. Appellant is claiming a process and product in which free sulfur and alkaline earth carbonates are used as bonding agents in metal containing ore aggregates. Both Johnson et al. and Amberg teach the carbonate bonding process for metal containing ore aggregates. Both Russo and Schaefer et al. teach the use of free sulfur as a bonding agent in metal containing ore aggregates. In the Russo and Schaefer et al. processes the aggregates are fired or sintered at elevated temperatures. It would be within the skill of a routinier in this art, in view of the references, to use both the free sulfur and the carbonate bonding agents in order to produce metal containing ore aggregates having high strength at elevated temperatures. There is nothing to show that appellant's result of high strength at elevated temperatures is anything but the aggregate effect of the two bonding agents. In the absence of a showing of unexpected or synergistic result, we will sustain this rejection.

A separate rejection under § 103 of claims 4 and 5 over Bell in view of Johnson was also affirmed. The board said, " * * * we consider these references as merely cumulative evidence as to the obviousness of appellant's product."

Opinion

We think the board's decision must be reversed. Appellant alleges, and his specification

² Strength of lump ore is a measure of its resistance to disintegration back to a finely divided state.

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supports the conclusion, that the addition of sulfur to the basic carbonate bond process results in an enhancement of the strength of the lump ore at high temperatures. The board does not dispute the allegation but dismisses it as being merely the aggregative effect of combining sulfur with the carbonate bond process. In our view, this conclusion is not supported by the record.

[1] With regard to the principal rejection, we agree that combining the teaching of Schaefer with that of Johnson or Amberg would give the beneficial result observed by appellant. However, the mere fact that those disclosures *can* be combined does not make the combination obvious unless the art also contains something to suggest the desirability of the combination. In *re* Bergel, 48 CCPA 1102, 292 F.2d 955, 130 USPQ 206 (1961). We find no such suggestion in these references.

Schaefer does teach that sulfur can be used as a bonding agent for finely divided ore. However, his disclosure also reveals that at high temperatures the sulfur is burned away and the lump ore loses strength. To overcome this problem, he would incorporate into the pellet a known high temperature bonding agent such as bentonite. According to Schaefer, bentonite is a clay material and unsatisfactory as a *low temperature* bonding agent.

Contrast this teaching to what appellant has done. He combines two processes known to result in lump ore having high strength at low temperatures but not at high temperatures; yet obtains a lump ore having improved strength in both situations. We consider this to be unexpected and unobvious in view of the art despite the board's contention to the contrary. In fact, we think that the art suggests that no desirable effect would result from the combination as Schaefer teaches that the sulfur will be burned away as the temperature is raised and, therefore, would contribute nothing to the combination.

We do not think that one skilled in the art would be led by the teachings of Russo to employ sulfur in the carbonate bond process. In the first place, Russo uses sulfur in a high temperature molding process employed to make finished articles of high strength from iron powder. The reference does not suggest that this strength is improved at high temperatures such as are encountered in the metallurgical processes for which lump ore is useful.

Secondly, there is nothing in the record to suggest that the problems of powder metallurgy in any way resemble those of lump ore preparation. Therefore, if Russo would suggest that sulfur improves the strength at high temperatures of articles molded from iron powder, we think one skilled in the art would not view this to be significant in view of the contrary suggestion in Schaefer, a more per-

tinent reference, concerning the effect of adding sulfur to a metal ore.

In view of all the art of record, we also believe that the secondary rejection of claims 4 and 5 cannot be sustained. At the outset, we note that Bell's basic goal was to improve the high temperature performance of the pellets and that free sulfur was merely an optional agent not essential to this purpose. However, in view of Schaefer's disclosure that free sulfur is an adequate agent for imparting low temperature stability to ore pellets, the art does not appear to suggest that there would be any advantage to be obtained by using the carbonate bond process with Bell's pellets if they also contain sulfur. In the absence of such a suggestion, we conclude that the combination would not have been obvious.

For the foregoing reasons, we hold that the claimed invention would not have been obvious to one skilled in the art at the time it was made. Accordingly, the board's decision is reversed.

Court of Customs and Patent Appeals

CHAMPION INTERNATIONAL CORPORATION
v. THE GILBERT & BENNETT
MANUFACTURING COMPANY

No. 9032

Decided Nov. 15, 1973

Appeal from Trademark Trial and Appeal Board of the Patent Office; 171 USPQ 254.

Trademark opposition No. 49,405 by The Gilbert & Bennett Manufacturing Company against Champion International Corporation, application, Serial No. 300,664, filed June 18, 1968. From decision sustaining opposition, applicant appeals.

Editor's Note: Affirmed without published opinion.

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